Volunteer Lake Assessment Program Individual Lake Reports

HALFMOON LAKE, ALTON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	4,352	**Max. Depth (m):**	8.2	**Flushing Rate (yr^{1})**	2
Surface Area (Ac.):	253	**Mean Depth (m):**	4.4	**P Retention Coef:**	0.57
Shore Length (m):	6,000	**Volume (m^{3}):**	4,545,000	**Elevation (ft):**	640

TROPHIC CLASSIFICATION

Year	Trophic class
1978	OLIGOTROPHIC
1992	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

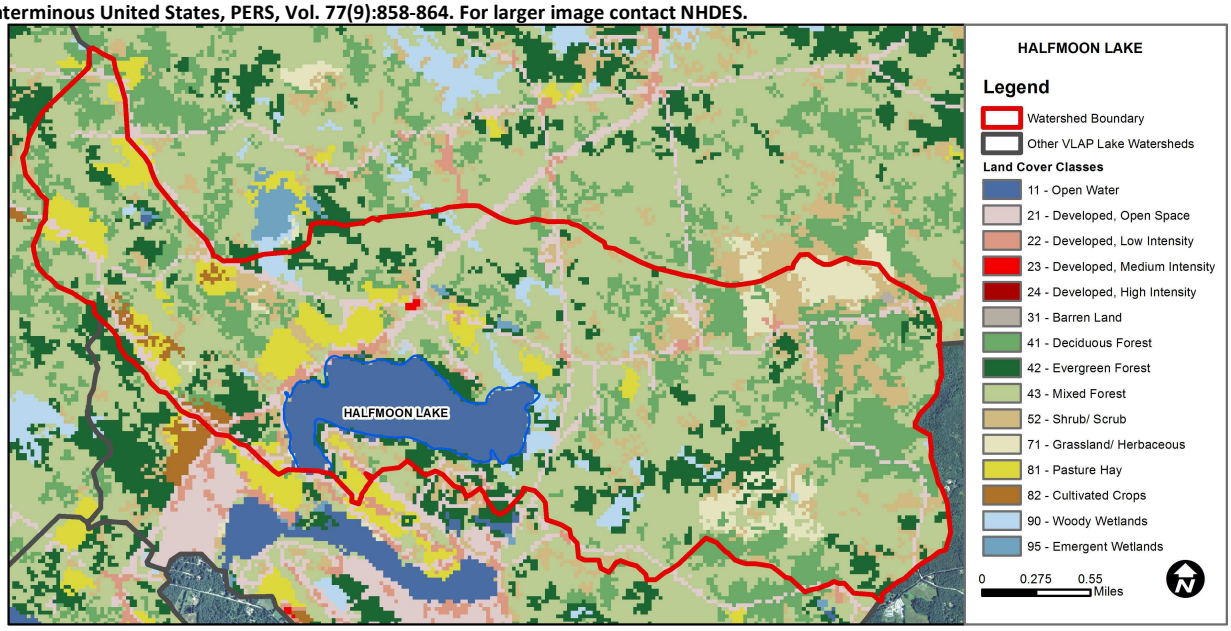
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

HALFMOON LAKE - CAMP MI-TE-NA BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	7.29	Barren Land	0.05	Grassland/Herbaceous	3.4
Developed-Open Space	6.06	Deciduous Forest	14.96	Pasture Hay	5.88
Developed-Low Intensity	1.06	Evergreen Forest	10.21	Cultivated Crops	0.67
Developed-Medium Intensity	0.05	Mixed Forest	39.34	Woody Wetlands	2.08
Developed-High Intensity	0	Shrub-Scrub	8.77	Emergent Wetlands	0.16

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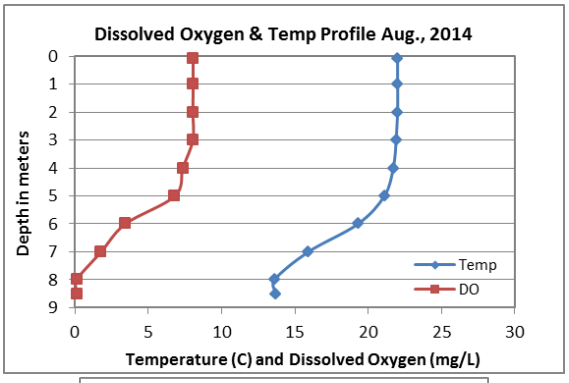
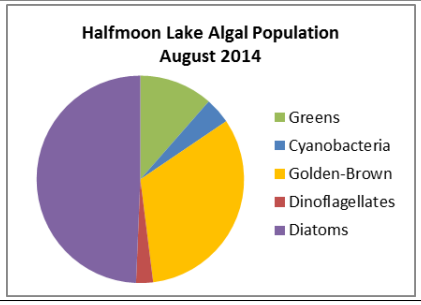
Halfmoon Lake, Barnstead

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were average in June and decreased to lower levels in July and August. The average chlorophyll level was slightly less than the state median and historical trend analysis indicates stable chlorophyll since monitoring began.
- **Conductivity/Chloride:** Deep spot and Rt. 28 Inlet conductivity and chloride levels were slightly greater than the state medians. Horse Farm Inlet conductivity and chloride were slightly elevated and greater than the state medians. Fern Hill Inlet conductivity and chloride was approximately equal to the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity since monitoring began.
- **E. coli:** All Beach E. coli levels were low on each sampling event and much less than the state standard of 88 cts/100 mL for public beaches.
- **Total Phosphorus:** Epilimnetic phosphorus levels decreased slightly from June to July and then increased slightly from July to August but remained low and less than the state median. Historical trend analysis indicates stable epilimnetic phosphorus since monitoring began. Hypolimnetic (lower water layer) phosphorus levels were low in June and average in July and August. Dugans Inlet and Fern Hill Inlet phosphorus levels were average and stable. Rt. 28 Inlet and Horse Farm Inlet phosphorus levels were slightly elevated and increased as the summer progressed and tributary flows decreased.
- **Transparency:** Transparency was lower in June and then improved and remained stable in July and August. Transparency measured with the viewscope (VS) was better than without and likely a more accurate representation of water clarity. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **Turbidity:** Epilimnetic turbidity was slightly elevated in June following a significant storm event and then decreased in July and August. Hypolimnetic turbidity was slightly elevated on each sampling event potentially due to the accumulation of organic compounds when oxygen levels are depleted. Dugans Inlet turbidity was slightly elevated in June likely due to low flows which are typical at this station. Rt. 28 Inlet and Horse Farm Inlet turbidities increased as the summer progressed and tributary flows decreased.
- **pH:** Epilimnetic pH was within the desirable range of 6.5—8.0 units however hypolimnetic pH was less than desirable. Historical trend analysis indicates relatively stable epilimnetic pH with high variability between years.
- **Recommended Actions:** Continue monitoring tributary and lake chloride levels to assess winter road maintenance activities. The storm event in June led to increased deep spot turbidity and that may indicate stormwater runoff is transporting unstable sediments to the lake, and/or wave action is causing shoreline erosion. Stabilize shorelines using native plantings and vegetation to prevent erosion into the lake. Utilize UNH's Lake Friendly Landscaping guide. Keep up the great work!





Station Name	Table 1. 2014 Average Water Quality Data for HALFMOON LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	5.23	3.93	10	59.6		8	3.33	4.83	0.99	6.72
Hypolimnion				62.0		13			3.73	6.34
Boys Camp					10					
Dugans Inlet			15	81.4		20			2.57	6.33
Fern Hill Inlet			4	32.2		22			1.41	6.43
Hollywood Beach					7					
Horse Farm Inlet			18	90.3		26			6.11	6.44
Public Beach					2					
Rt. 28 Inlet			7	63.2		47			4.67	6.75
Rustic Shores					13					

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.